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ABSTRACT

Personnel involved in planning or developing schools lack the costing tools that will enable them to determine educational technology costs. This report presents an overview of the technology costing process and the general costs used in estimating educational technology systems on a macro-budget basis, along with simple cost estimates for technology systems based on a per-port system. It offers suggestions on determining the quantity and types of space required during the preliminary stages of project design and how to determine the educational technology budget. A sample budgetary worksheet is included. (GR)

ISSUETRAK

A CEFPI Brief on Educational Facility Issues

Topic : Implementation Costs for Educational Technology Systems
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Personnel involved in planning or developing schools have cost estimating tools which enable them to determine construction macro-budgets from simplified data structures. Unfortunately, they do not have similar tools that enable them to determine educational technology costs for those same projects. The following is an overview of the process and general costs used in estimating educational technology systems on a macro-budget basis. Facility planners, architects, and school facility personnel can use this process to determine budgets during the bond planning, preliminary project planning and schematic stages of facility projects.

Based on data from more than thirty projects, we have developed simple cost estimates for technology systems based on a per-port system. Obviously, these costs will vary based on the region of the country you are in and the competency level and quantity of technology contractors available to you. Costs and components for each system listed below are based on facilities in the Midwest with an average of 35 instructional spaces. Please note _ as buildings become smaller, the per port price increases.

BASE LINE COST CATEGORIES AND PRICES

Infrastructure

New Construction $1,500 for each classroom equivalent	One additional 20-Amp 110VAC circuit— Six empty data box drops & six duplex outlets.
Renovation/Modernization $3,000 for each classroom equivalent	One new 20-Amp 110VAC circuit— Six empty data box drops & six duplex outlets, surface mounted. NOTE: For additional electrical service to building, add minimum $50,000.

Data Systems

Simple Ethernet Network (One head end) $350 per port.	Includes head end port, patch cord and patch panel, Category 5 copper cable to user port including connectors and labor, jumper cable from wall to computer, and computer set-up.
Distributed Ethernet Network (Head end with remote closets) $450 per port.	Includes head end equipment and fiber port, six strand fiber cable to remote cabinet locations including connectors and labor. Also includes remote data closest location with remote head end port, patch cord and patch panel, Category 5 copper cable to use port including connectors and labor, jumper cable from wall to computer or printer, and set up of printer or computer.
Collapsed Backbone Ethernet Network (Head end with hub in every classroom) $450 for first port in room; $225 per port (secondary) thereafter.	Includes head end equipment and fiber port for each room, four strand fiber cable to each classroom, connectors and labor for installation, and a small (6 or 8 port) dumb hub in each room. Category 5 copper cable is run from the hub in the room to each data port location required.

Computers

Teacher Workstations $2,500 each.	Medium high end computer (150 MHz), includes Network Interface Card @ $100 and printer allowance of $400.
Student Workstations $1,900 each.	Lower end computers (100 MHz), includes Network Interface Card @ $100 and printer allowance of $200.
Multi-Media/Reference Stations $2,800 each	High end performance computer with sound board, speakers (headsets), multi-speed CD-ROM drive.
Fileservers $10,000 each	Provide one fileserver for every 50 computers.
Computer Content 10%	Determine total value of computer purchases and add 10% for software content purchases. (Special content—administrative and library software packages are additional costs.)
Production Systems Minimum of: $15K/elementary school; $25K/middle school; $40K/high school.	Video and computer components for students and staff to generate content.

Video System

Video Display with Installation $1,000 per location.	Includes a 31" display installed with monitor mount and local inputs down low for use with movable video equipment
Video Distribution $750 per location.	Includes a coaxial cable TV distribution system throughout facility and one steerable C/Ku satellite antenna with receiver/tuner.
Media Retrieval $2,750 per location.	Includes the head end equipment and source for a media retrieval system.
Video Content	Take 10% of the total video budget and set aside for purchase of video content which is intended for use on the video system.

Voice Systems

Public Address Systems $150 per speaker.	Includes master clock, tone generator, zonal interface, PBX interface, and power amplifier at head end. Additionally, the cable running to the speaker and speaker with back box or surface mounted box are included.
PBX Phone System $500 per line.	Includes PBX switch port, cabling to phone, connectors and labor, and phone instrument. Include four lines for voice mail and the lines coming to the building.
Voice Mail Systems	Add as follows: $8K/elementary school; $12K/middle school; $16K/high school.

Professional Development

Determine your total budget and set aside 5-10% of it for professional development costs associated with the installation of educational technology systems.

DETERMINING QUANTITIES OF EACH TYPE OF TECHNOLOGY CATEGORY

A feel for the quantity and types of space required is determined during the preliminary stages of project design. These spaces can be divided into the following five types of spaces.

• ***Instructional Space*** — These spaces are defined as any location where student instruction will take place 80% of the school day. For example, classrooms and science labs would be considered instructional spaces. NOTE: Media centers, which contain instruction areas, are considered instructional spaces with extra computers and offices.

• ***Computer Lab*** — Defined as any space with a large concentration of computers where the primary instructional functions are delivered via one computer for every student. These may include smaller project labs (8-12 computers) and larger computer labs (20-35 computer stations).

• ***Flex Space*** — This is a location where instruction utilizes the space for less than 80% of the instructional day but still requires some type of technology support of the instruction program delivered. Typically, these areas include a cafeteria, gymnasium, conference room and/or auditorium.

• ***Media Center*** — Typically, media centers contain multiple implementations of technology. Where applicable, portions of a media center may be considered classrooms, computer labs, or offices. Additionally, these center will have computers related to a library automation system and multi-media stations available for research and remote data access functions.

• ***Office*** — An office is any smaller location which is not typically utilized for instructional functions yet the person occupying the space needs access to a phone and a data port for a computer. The space can be an office, a cubicle, or simply a desk. Personnel (and therefore their spaces) whom we categorize as requiring office space would be administrators, secretaries, counselors, nurses, teacher offices, and custodians.

Based on the instructional or administrative needs of the facility, a simple technology program description must be developed for each type of space. The program description should outline the specific technology planned for the space, [i.e., the Instruction Space will have one teacher computer with a printer, two student computers with one printer (yielding five data ports), a telephone, a video display and output from a video distribution system with media retrieval capacity, and a public address speaker.] Additionally, will you need to upgrade the infrastructure in an existing building or add infrastructure to the scope of a new building?

From the Types of Spaces count and the Technology Program Description of each space, you then can create a matrix which lists the number of ports or components in each space. A subsequent matrix should multiply the number of components times the quantity of each space and then total the ports and components of the same nature. Once you have determined the number of each type of port or component, add 10% spares to the quantity and sum.

DETERMINING EDUCATIONAL TECHNOLOGY BUDGET

• ***Infrastructure***
To arrive at a total cost of infrastructure, you must determine the number of classroom equivalents. Using a classroom as the base, the cost of all other types of space is calculated as a portion of, or as an increase to a typical classroom. The ratios used are as follows: Classroom: 1=1 Computer Lab: 1=2 Flex Space: 3=1 Office: 6=1 Media Center: 1=2

Once your classroom equivalents have been determined, multiply them times the new construction or renovation cost to determine your infrastructure budget.

• ***Systems***
To determine your Educational Technology Systems costs, use the total sum of each type of technology port or component, then simply multiply the quantity times the port or component costs. For the computers and video, add in your content and production costs. For the phone, add in your voice-mail costs. Add 5-10% for professional development costs, and 5% of the total as a contingency budget.

By utilizing this macro-budgeting process, you should be able to arrive at an Educational Technology Systems budget that can be used throughout the planning process.

EDUCATIONAL TECHNOLOGY BUDGET WORKSHEET

PROJECT: New Construction or Renovation

ROOM TOTALS

ROOM TYPE	Quantity	Video Display	Video Distribution	Media Retrieval	Phone	Primary Data port	Secondary Data port	Teacher Workstation	Student Workstation

Instr Spaces	
Computer Lab	
Flex Spaces	
Media Center	
Office	
TOTAL	

Infrastructure: Total Rooms x Infra Cost = Total _____ x _____ = _____

Data Systems: Total Ports x Per Port Cost = Total _____ x _____ = _____

Computers: Total TWS x Per Unit Cost = Subtotal _____ x _____ = _____

Total SWS x Per Unit Cost = Subtotal _____ x _____ = _____

Total MMWS x Per Unit Cost = Subtotal _____ x _____ = _____

TOTAL = _____

Video: Total Displays x Per Unit Cost = Subtotal _____ x _____ = _____

Total Distrib x Per Unit Cost = Subtotal _____ x _____ = _____

Total Media Retrieval x Per Unit Cost = Subtotal _____ x _____ = _____

TOTAL = _____

Voice:

Phones Total Phones x Per Unit Cost = Total _____ x _____ = _____

Voice Mail Cost Per School = _____ Public Address Total Speakers x Per Unit Cost = Total _____ x _____ = _____

Totals: Infrastructure = _____

Data = _____

Computers = _____

Video = _____

Phones = _____

TECHNOLOGY TOTAL = _____

Software (10%) = _____

Video Content (10%) = _____

Staff Development (5% - 10%) = _____

Contingency (5%) = _____

OTHER TOTAL = _____

PROJECT TOTAL = _____

ISSUETRAK is prepared by The Council of Educational Facility Planners, International as a service to its membership.

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